

THAT WHICH IS CLAIMED:

1. An image displaying apparatus comprising:

a light source for emitting a beam containing at least three primary colors;

5 first to third reflective spatial light modulators corresponding to the three primary colors, respectively;

a color separating optical system for separating the beam emitted from the light source into three primary color beams and guiding the three primary color beams toward the first to third reflective spatial light modulators;

10 first to third reflective polarizing plates for polarizing and separating the corresponding primary color beam guided by the color separating optical system into a linearly polarized beam of a first polarized state, transmitting and injecting the linearly polarized beam of the first polarized state into the corresponding reflective spatial light modulator, polarizing and separating modulated-and-reflected beam from the corresponding reflective spatial light modulator into a linearly polarized beam of a second
15 polarized state, and reflecting the linearly polarized beam of the second polarized state;

a color combining optical system for combining the three primary color beams modulated by the reflective spatial light modulators and reflected by the reflective polarizing plates into a composite beam;

20 an image forming optical unit for receiving the composite beam and forming an image according to the received composite beam; and wherein

the color separating optical system has a larger effective diameter than the color combining optical system.

25 2. The image displaying apparatus of claim 1, wherein the color separating optical system comprises:

a first dichroic mirror for separating the beam from the light source into a first-second primary color beam and a third primary color beam;

a second dichroic mirror for separating the first-second primary color beam into a first primary color beam and a second primary color beam; and

30 first to third steering mirrors for substantially vertically deflecting the first to third primary color beams, respectively, toward the first to third reflective polarizing plates and first to third reflective spatial light modulators.

3. The image displaying apparatus of claim 2, wherein
the optical axes of the beams traveling from the first to third steering mirrors to
the first to third reflective spatial light modulators are parallel to one another.

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4. The image displaying apparatus of claim 1, wherein
the color combining optical system is a cross dichroic prism, the first to third
reflective spatial light modulators are attached to a planar substrate at three locations
around the cross dichroic prism that is also attached to the planar substrate, and beam
10 incident faces of the reflective spatial light modulators are substantially on the same plane.

5. An image displaying apparatus comprising:
a light source for emitting a beam containing at least three primary colors;
first to third reflective spatial light modulators corresponding to the three primary
15 colors, respectively;

a color separating optical system for separating the beam emitted from the light
source into three primary color beams and guiding the three primary color beams toward
the first to third reflective spatial light modulators through first to third steering mirrors,
respectively;

20 first to third reflective polarizing plates for polarizing and separating the
corresponding primary color beam guided by the color separating optical system into a
linearly polarized beam of a first polarized state, transmitting and injecting the linearly
polarized beam of the first polarized state into the corresponding reflective spatial light
modulator, polarizing and separating a modulated-and-reflected beam from the
25 corresponding reflective spatial light modulator into a linearly polarized beam of a second
polarized state, and reflecting the linearly polarized beam of the second polarized state;

a color combining optical system for combining the three primary color beams
modulated by the reflective spatial light modulators and reflected by the reflective
polarizing plates into a composite beam; and

30 an image forming optical unit for receiving the composite beam and forming an
image according to the received composite beam.

6. The image displaying apparatus of claim 5, wherein the color separating

optical system comprises:

a first dichroic mirror for separating the beam from the light source into a first-second primary color beam and a third primary color beam; and

5 a second dichroic mirror for separating the first-second primary color beam into a first primary color beam and a second primary color beam.

7. The image displaying apparatus of claim 5, wherein

the color combining optical system is a cross dichroic prism, the first to third reflective spatial light modulators are attached to a planar substrate at three locations
10 around the cross dichroic prism that is also attached to the planar substrate, and beam incident faces of the reflective spatial light modulators are substantially on the same plane.

8. An image displaying apparatus comprising:

15 a light source for emitting a beam containing at least three primary colors;

first to third reflective spatial light modulators corresponding to the three primary colors, respectively;

a color separating optical system for separating the beam emitted from the light source into three primary color beams and guiding the three primary color beams toward
20 the first to third reflective spatial light modulators through first to third steering mirrors, respectively;

first to third reflective polarizing plates for polarizing and separating the corresponding primary color beam guided by the color separating optical system into a linearly polarized beam of a first polarized state, transmitting and injecting the linearly
25 polarized beam of the first polarized state into the corresponding reflective spatial light modulator, polarizing and separating a modulated-and-reflected beam from the corresponding reflective spatial light modulator into a linearly polarized beam of a second polarized state, and reflecting the linearly polarized beam of the second polarized state;

a color combining optical system for combining the three primary color beams
30 modulated by the reflective spatial light modulators and reflected by the reflective polarizing plates into a composite beam;

an image forming optical unit for receiving the composite beam and forming an

image according to the received composite beam, and wherein

the optical axes of the beams traveling from the first to third steering mirrors to the first to third reflective spatial light modulators are parallel to one another, the planes of polarization of two of the beams are orthogonal or parallel to each other.

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9. A color separating-combining optical system comprising:

first to third reflective spatial light modulators corresponding to first to third primary colors, respectively, the primary colors being contained in a beam emitted from a light source;

10 a color separating optical system for separating the beam emitted from the light source into three primary color beams and guiding the three primary color beams toward the first to third reflective spatial light modulators;

first to third reflective polarizing plates for polarizing and separating the corresponding primary color beam guided by the color separating optical system into a
15 linearly polarized beam of a first polarized state, transmitting and injecting the linearly polarized beam of the first polarized state into the corresponding reflective spatial light modulator, polarizing and separating a modulated-and-reflected beam from the corresponding reflective spatial light modulator into a linearly polarized beam of a second polarized state, and reflecting the linearly polarized beam of the second polarized state;

20 a color combining optical system for combining the three primary color beams modulated by the reflective spatial light modulators and reflected by the reflective polarizing plates into a composite beam, and wherein

the optical axes of the primary color beams passing through the color separating optical system, reflective polarizing plates, and color combining optical system are
25 substantially on the same plane, the lengths of optical paths for the primary color beams from the light source to the reflective spatial light modulators are substantially equal to one another,

the color combining optical system includes at least first to third prisms arranged to include at least first and second pairs of opposing faces, the first pair of opposing faces
30 has a first reflective layer to transmit the first primary color beam and reflect the second primary color beam, the second pair of opposing faces has a second reflective layer to transmit the first and second primary color beams and reflect the third primary color beam,

the first primary color beam entering the first prism is transmitted through the first reflective layer, second prism, second reflective layer, and third prism and emitted from the third prism,

5 the second primary color beam entering the second prism is reflected by the first reflective layer, transmitted through the second prism, second reflective layer, and third prism, combined with the first primary color beam, and emitted from the third prism,

the third primary color beam entering the third prism is reflected by the second reflective layer, transmitted through the third prism, combined with the second and third primary color beams and emitted from the third prism.

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10. An image displaying apparatus comprising:

the color separating-combining optical system of claim 9;

a light source for emitting a beam containing at least three primary colors toward the color separating optical system of the color separating-combining optical system; and

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an image forming optical unit for receiving the composite beam from the color combining optical system of the color separating-combining optical system and forming an image according to the received composite beam.